



**UNITED STATES DEPARTMENT OF COMMERCE**  
**Patent and Trademark Office**

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/160,657 09/25/98 LYDING

MM91/0126

KENNETH A GANDY  
BANK ONE TOWER  
SUITE 3700  
111 MONUMENT CIRCLE  
INDIANAPOLIS IN 46204-5137

EXAMINER

ART UNIT/ERR/ERR/PAPER NUMBER

DATE MAILED 03/22

01/26/01

**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

<b>Office Action Summary</b>	Application No. 09/160,657	Applicant(s) LYDING ET AL.	
	Examiner Maria Guerrero	Art Unit 2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 06 November 2000.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 40-48 and 60-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 40-48 and 60-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. § 119**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

**Attachment(s)**

- |  |  |
|--|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                   | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                          | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>20</u> . | 20) <input type="checkbox"/> Other:  |

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### DETAILED ACTION

1. This Office Action is in response to the Amendment filed November 6, 2000.

Claims 1-39, 49-59 are canceled.

Claims 40-48, 60-65 are pending.

### *Terminal Disclaimer*

2. The terminal disclaimer filed on May 7, 1999 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of U.S. Patent No. 5,872,387 has been reviewed and is accepted. The terminal disclaimer has been recorded.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 40-48 and 60-65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lisenker et al. (PCT/US94/01669) (WO 94/19829) (cited by Applicant).

Lisenker et al. discloses a semiconductor device having a MOS device, the semiconductor device having an interface between a silicon layer and a gate oxide layer, the semiconductor device being treated with deuterium (pages 1-14). Lisenker et al. teaches the deuterium containing devices have improved stability, quality, and reliability (page 5, lines 1-5). Lisenker et al. teaches contacting the silicon wafer with

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deuterium before, during and/or after formation of the device (page 6, lines 10-15).

Lisenker et al. discloses the silicon layer being single crystal silicon (page 6, lines 35-36).

As to the process limitations, note that a "product by process" claim is directed to the product per se, no matter how actually made and that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process.

As to the claimed "practical lifetime" note that the comparison to a hydrogen-passivated fails to structurally define over Lisenker et al.'s device.

Furthermore, it would have been obvious to a person of ordinary skill in the art to define the practical lifetime of Lisenker et al.'s device because this is well known in the art.

4. Claims 40-48 and 60-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over N. S. Saks et al. "Time-dependence of the interface trap build-up in deuterium-annealed oxides after irradiation".

N. S. Saks et al. teaches a semiconductor device comprising a field effect transistor having a Si-SiO<sub>2</sub> interface being treated with deuterium. N. S. Saks et al. discloses heating with deuterium at 900° C for 30 min (pages 3014-3016).

As to the process limitations, note that a "product by process" claim is directed to the product per se, no matter how actually made and that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process.

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As to the claimed "practical lifetime" note that the comparison to a hydrogen-passivated fails to structurally define over Saks et al.'s device.

In addition, it would have been obvious to a person of ordinary skill in the art to define the practical lifetime of Saks et al.'s device because this is well known in the art.

### ***Response to Arguments***

5. Applicant's arguments filed November 6, 2000 have been fully considered but they are not persuasive. The Rejection is maintained.

Regarding the process limitations, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985) (citations omitted). MPEP 2113.

Regarding the new cited references W. F. Clark and D. J. DiMaria, the information provided has been considered but Applicant's arguments are not persuasive.

Applicant argued that the device defined in any of claims 40-65 has a structure that is differentiated from the structure produced by Lisenker and Saks. However, Both references disclose a semiconductor device comprising a field effect transistor having n interface between a semiconductor silicon layer and a gate oxide layer having

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deuterium at the interface (Lisenker, Abstract, page 4, lines 20-35, page 12, lines 3-30) (Saks, page 3014, 3016).

Regarding the practical lifetime, Lisenker et al. teaches the deuterium containing devices have improved stability, quality, and reliability (page 5, lines 1-5). Therefore, a person of ordinary skill in the art would define the practical lifetime based on this concept.

### ***Conclusion***

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Lyding et al. (U.S. 6,147,014) (same Applicant) discloses semiconductor devices with deuterium to improve operating characteristics.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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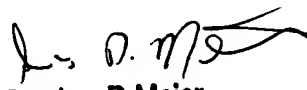
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is (703) 305-0162. The examiner can normally be reached on Monday-Friday from.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, can be reached on (703) 308-4940. The fax phone number for this Group is (703) 308-7722.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

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January 25, 2001

  
Stephen D. Meier  
Primary Examiner